

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) An apparatus for removing metal from a wafer edge, comprising:
a bath tank for containing a chemical bath;
a rotatable wafer chuck for holding a wafer non-movable relative to the rotatable wafer chuck during rotation of the rotatable wafer chuck and vertical to the chemical bath, wherein at least ~~the~~an edge of the wafer is covered with a metal layer; and
a sliding element disposed on one end of the rotatable wafer chuck such that the rotatable wafer chuck ~~can move~~is movable in a vertical direction to the chemical bath.

2. (Original) The apparatus as claimed in claim 1, further comprising a front suppression line disposed substantially in front of the wafer and near the surface of the chemical bath to provide a first flow for suppressing the chemical bath from splashing the wafer.

3. (Original) The apparatus as claimed in claim 2, wherein the first flow comprises an inert gas with a flow rate between 5~100 sccm.

4. (Original) The apparatus as claimed in claim 1, further comprising a front rinse line disposed in front of the wafer to provide a rinse fluid for cleaning the front wafer surface.

5. (Original) The apparatus as claimed in claim 4, wherein the flow rate of the rinse fluid is between 500~30000 ml/min.

6. (Original) The apparatus as claimed in claim 2, further comprising a front rinse line disposed in front of the wafer and in a position closer to the wafer center than the front suppression line to provide rinse fluid for cleaning the front wafer surface.

7. (Original) The apparatus as claimed in claim 6, wherein the flow rate of the rinse fluid is between 500~30000 ml/min.

8. (Original) The apparatus as claimed in claim 1, further comprising a rear suppression line disposed substantially behind the wafer and near the surface of the chemical bath to provide a second flow for suppressing the chemical bath from splashing the wafer.

9. (Original) The apparatus as claimed in claim 8, wherein the second flow comprises an inert gas with a flow rate between 5~100 sccm.

10. (Original) The apparatus as claimed in claim 1, further comprising a rear rinse line disposed behind the wafer to provide a rinse fluid for cleaning the rear wafer surface.

11. (Original) The apparatus as claimed in claim 10, wherein the flow rate of the rinse fluid is between 500~30000 ml/min.

12. (Original) The apparatus as claimed in claim 8, further comprising a rear rinse line disposed behind the wafer and in a position closer to the wafer center than the rear suppressive nozzle to provide rinse fluid for cleaning the rear wafer surface.

13. (Original) The apparatus as claimed in claim 12, wherein the flow rate of the rinse fluid is between 500~30000 ml/min.

14. (Original) A method for removing metal from a wafer edge, comprising the steps of:
providing a wafer with a metal layer at least covering the edge thereof;
vertically immersing a predetermined portion of the wafer into a chemical bath for etching the metal layer; and
rotating the wafer to remove the metal layer of the predetermined portion from the surface and the edge thereof.

15. (Original) The method as claimed in claim 14, wherein the predetermined portion is about 1~5 mm from the wafer edge.

16. (Original) The method as claimed in claim 14, further comprising the step of providing a front suppression flow to the surface of the chemical bath near the front wafer surface during the wafer edge metal removal to suppress the chemical bath from splashing a portion of the wafer.

17. (Original) The method as claimed in claim 16, wherein the front suppression flow is provided by a front suppression line disposed in front of the front wafer surface.

18. (Original) The method as claimed in claim 16, wherein the front suppression flow comprises an inert gas.

19. (Original) The method as claimed in claim 14, further comprising the step of providing a front rinse flow for cleaning the front wafer surface subsequent to the wafer edge metal removal.

20. (Original) The method as claimed in claim 19, wherein the front rinse flow is provided by a front rinse line disposed in front of the wafer.

21. (Original) The method as claimed in claim 16, further comprising the step of providing a rinse fluid to the front wafer surface for cleaning the rear wafer surface subsequent to the wafer edge metal removal.

22. (Original) The method as claimed in claim 16, wherein the front rinse flow is provided by a front rinse line disposed in front of the wafer and in a position closer to the wafer center than the front suppression line.

23. (Original) The method as claimed in claim 14, wherein the wafer is rotated at a speed between 5 to 300 rpm by a rotatable wafer chuck.

24. (Original) The method as claimed in claim 14, wherein the metal layer is a copper layer.

25. (Original) The method as claimed in claim 24, wherein the chemical bath comprises a solution of sulfuric acid, H₂O₂ and DI water.

26. (Currently Amended) The method as claimed in claim 14, ~~which~~ wherein the method is performed using the an apparatus, the apparatus including a rotatable wafer chuck and a sliding element, the rotatable wafer chuck being for holding the wafer, the sliding element being disposed on one end of the rotatable wafer chuck such that the rotatable wafer chuck is movable in a vertical direction to the chemical bath of claim 1, the method further comprising the steps step of: disposing the wafer on the rotatable wafer chuck; wherein the step of vertically immersing the predetermined portion of the wafer into the chemical bath includes vertically immersing the edge of the wafer ~~edge~~ into the chemical bath by moving the sliding element; ~~and~~ wherein the step of rotating the wafer including rotating the rotatable wafer chuck to remove the metal layer at the wafer edge.

27. (New) The apparatus as claimed in claim 1, wherein the rotatable wafer chuck is for holding a backside of the wafer.

28. (New) The method as claimed in claim 26, wherein the step of disposing the wafer on the rotatable wafer chuck includes disposing a backside of the wafer onto the rotatable wafer chuck.

29. (New) The method as claimed in claim 26, wherein the step of disposing the wafer on the rotatable wafer chuck includes holding the wafer non-movable relative to the rotatable wafer chuck during rotation of the rotatable wafer chuck.

30. (New) The method as claimed in claim 26, wherein the step of rotating the wafer includes rotating a backside of the wafer.

31. (New) The method as claimed in claim 14, wherein the step of providing the wafer with the metal layer at least covering the edge thereof includes providing the wafer with the metal layer at least covering a lateral side edge of the wafer.